REMARKS

Claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, 42, and 49-53 are all of the claims presently pending in the application. Claim 40 has been canceled. Claims 49-53 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant appreciates the Examiner's acknowledgment that claims 5-8, 12, 16, 38 and 42 are allowed.

Claims 10 and 40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lin et al. (U.S. Patent No. 6,181,849) (hereinafter "Lin"). Claims 10, 36, and 40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Katsunari et al. (JP No. 10-197735) (hereinafter "Katsunari").

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention, of exemplary claim 10 (and similarly claim 36), is directed to an arrayed waveguide grating. The arrayed waveguide grating includes a channel waveguide array having a plurality of waveguides, an input slab waveguide connected to the channel waveguide array, at least one output waveguide, a plurality of input waveguides connected to the input slab waveguide and an output slab waveguide for connecting the channel waveguide array to the at least one output waveguide. The central axes of selected input waveguides are displaced along a direction perpendicular to the central axes from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide.

Conventional arrayed waveguide gratings are used as optical wavelength filters in optical communication systems. The arrayed waveguide gratings include at least one input waveguide, a plurality of output waveguides, a channel waveguide array, an input slab waveguide connecting the input waveguides to the channel waveguide array and an output slab waveguide connecting the output waveguides to the channel waveguide array. The intensity of light that passes through the output waveguides varies depending on the position of each output waveguide. In order to adjust the levels of the optical signals that are detected from the output waveguides, attenuations for compensating loss differences are individually connected to the respective output waveguides. It is necessary, however, to prepare as many resistors having different resistances as the number of the different levels of the optical signals that are detected from the output waveguides.

The claimed invention of exemplary claim 10 (and similarly claim 36), on the other hand, provides an arrayed waveguide grating where the central axes of selected input waveguides are displaced along a direction perpendicular to the central axes from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide. (see Application at page 81, lines 12-16). The axial misalignment or displacement may be set to a suitable value to equalize the intensity of light propagated through the selected input waveguides to provide flat output characteristics (see Application at page 81, line 24 through page 82, line 5).

II. THE PRIOR ART REFERENCE

A. The Lin Reference

The Examiner alleges that Lin et al. teaches the claimed invention of claims 10 and 40. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Lin.

That is, contrary to the Examiner's allegations, Lin does not teach or suggest that "*wherein central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing*

positions by predetermined values to attenuate said signal lights propagated through said selected input waveguides to said at least one output waveguide", as recited in claim 10, and similarly recited in claim 36.

As noted above, unlike conventional arrayed waveguide gratings, the claimed invention of exemplary claim 10 (and similarly claim 36) provides an arrayed waveguide grating including a channel waveguide array having a plurality of waveguides, an input slab waveguide connected to the channel waveguide array, at least one output waveguide, a plurality of input waveguides connected to the input slab waveguide and an output slab waveguide for connecting the channel waveguide array to the at least one output waveguide. The central axes of selected input waveguides are displaced along a direction perpendicular to the central axes from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide. (see Application at page 81, lines 12-16). The axial misalignment or displacement may be set to a suitable value to equalize the intensity of light propagated through the selected input waveguides to provide flat output characteristics (see Application at page 81, line 24 through page 82, line 5).

Clearly the novel features of the claimed invention are not taught or suggested by Lin. Indeed, the Examiner attempts to rely on Figures 7A-7C to support his allegations. The Examiner, however, is clearly incorrect.

Figures 7A-7C of Lin merely disclose the same principal as that of a conventional arrayed waveguide grating, which is described in the Background section of the Application at page 2, line 5 through page 5, line 22. Lin describes a structure to simultaneously use arrayed waveguide gratings from two directions, wherein each output waveguide is disposed at a location where coupling of each channel light is maximized, as in the conventional structure to use only one direction. On the other hand, the claimed invention of claims 10 and 36 may intentionally arrange an output waveguide at a location being displaced from a maximum coupling position.

Furthermore, Lin teaches that when a waveguide grating device contains different input and output angular spacings, as in Figures 7A-7C, the asymmetrical input/output port

design will yield different demultiplexed wavelengths, when a signal is input from a different input port and is output from a different output port (e.g., see Lin at column 2, lines 49-54). With this design, the center wavelength of a waveguide grating device can be adjusted by inputting the multiplexed signal at an off-center port, i.e., the so-called Vernier effect.

Nowhere, however, in this passage (nor anywhere else for that matter) does Lin teach or suggest an arrayed waveguide grating where the central axes of selected input waveguides are displaced along a direction perpendicular to the central axes from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide. The Applicant clearly discloses that, as shown in Figure 9, "[c]ompensation waveguide 132_{m+n-1}, which is positioned adjacent to compensation waveguide 132_{m+n}, has its central axis 141_{m+n-1} displaced from corresponding output waveguide focusing position p_{m+n-1} by a slight distance d_{m+n-1}. Because of the axial misalignment, the light having a Gaussian intensity distribution, which has been focused at output waveguide focusing position p_{m+n-1}, mismatches compensation waveguide 132_{m+n-1} when it is propagated therethrough, causing a light intensity loss (attenuation) (see Application at page 81, lines 12-21).

Nowhere does Lin even mention causing a light intensity loss, let alone teach or suggest displacing the central axes of selected input waveguides from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide. In contrast, Lin shifts the waveguide input port 74 by a constant angle, so that the asymmetrical input/output port design will yield different demultiplexed wavelengths. Nowhere does Lin disclose, teach or suggest that shifting the second waveguide input port by a constant angle will attenuate (i.e. cause a loss of light intensity) the signal lights propagated through the selected input waveguides to the at least one output waveguide. Furthermore, nowhere does Lin disclose, teach or suggest that shifting the second waveguide input port corresponds to displacing the central axes of selected input waveguides from corresponding focusing positions, as recited by claims 10 and 36.

Claim 40 has been canceled by the present amendment. Therefore, the present

rejection of claim 40 is rendered moot.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest by Lin. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The Katsunari Reference

The Examiner alleges that Katsunari et al. teaches the claimed invention of claims 10, 36 and 40. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Katsunari.

That is, contrary to the Examiner's allegations, Lin does not teach or suggest that "*wherein central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing positions by predetermined values to attenuate said signal lights propagated through said selected input waveguides to said at least one output waveguide*", as recited in claim 10, and similarly recited in claim 36.

The Examiner attempts to rely on Figure 1 and the Abstract of Katsunari to support his allegations. The Examiner, however, is clearly incorrect.

Figure 6 of Katsunari merely discloses an arrayed waveguide grating having an input channel waveguide, a channel waveguide array and an output channel waveguide. The cores of respective input waveguides of the input channel waveguide spread in parabolic shape and have varying widths to obtain flat light frequency characteristics.

Nowhere, however, in this passage (nor anywhere else for that matter) does Katsunari teach or suggest an arrayed waveguide grating where the central axes of selected input waveguides are displaced along a direction perpendicular to the central axes from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide.

Claim 40 has been canceled by the present amendment. Therefore the present rejection of claim 40 is rendered moot.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest by Katsunari. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. NEW CLAIMS

New claims 49-53 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention. These claims are independently patentable because of the novel features recited therein.

Applicant respectfully submits that new claims 49-53 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 5-8, 10, 12, 16, 31-34, 38, 40 and 42.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, 42 and 49-53, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: August 17, 2004

Scott M. Tulino, Esq.
Registration No. 48,317

Sean M. McGinn, Esq.
Registration No. 34,386

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254